

Application No. 10/709,288  
Technology Center 1775  
Amendment dated June 23, 2006  
Reply to Office Action dated March 23, 2006

### **REMARKS**

In the Office Action, the Examiner reviewed claims 1-40 of the above-identified US Patent Application, with the result that claims 18-40 were withdrawn from consideration due to a restriction requirement, and claims 1-17 were rejected. In response, Applicants have amended the specification and claims as set forth above. More particularly:

The specification has been amended at paragraph [0020] to more accurately state that incidental impurities are "likely" present in the BSAS composition of the protective coating 20, since the "balance" of the BSAS composition in this particular passage would be zero in view of the molar percentages recited for barium oxide, strontia, alumina, and silica.

The specification has also been amended at paragraph [0031] to correct an error that occurred during conversion to the USPTO electronic format.

Independent claims 1 and 11 have been amended to require that the protective coating (20) consists (essentially) of barium oxide, strontia, alumina, and silica, and incidental impurities so as to have a barium-strontium aluminosilicate composition. Support for these limitations can be found throughout Applicants' specification, such as paragraphs [0018] ("a protective coating 20 formed of BSAS"), [0020] ("the BSAS composition of the protective

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coating 20"), and [0022] ("BSAS ( . . . incidental impurities)"), original claims 4 and 8, and the Abstract of the Disclosure ("The coating has a barium-strontium-aluminosilicate (BSAS) composition").

Claims 18-40 have been canceled (without prejudice to Applicants) as being drawn to an unelected invention.

New dependent claim 41 has been presented requiring that the protective coating (20) consists of barium oxide, strontia, alumina, silica, and incidental impurities. Support for this limitation can be found in original claims 4 and 8.

New dependent claim 42 has been presented requiring that the protective coating (20) is in a thermal treated state and either contains sealed porosity or is substantially free of pores formed by volatilization of the protective coating. Support for this limitation can be found in Applicants' specification at paragraphs [0008] and [0035], and in original claim 17.

New dependent claims 43 and 44 have been presented requiring that the protective coating (20) contains not more than ten (claim 43) or five (claim 44) volume percent of the nonstoichiometric second crystalline phase. Support for this limitation can be found in Applicants' specification at paragraph [0020].

New dependent claims 45 through 48 have been presented requiring a top coat of insulating material (e.g., stabilized zirconia) on the protective

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coating (20). Support for this limitation can be found in Applicants' specification at paragraph [0018].

Applicants believe that the above amendments do not present new matter. Favorable reconsideration and allowance of remaining claims 1-17 and 41-48 are respectfully requested in view of the above amendments and the following remarks.

#### **Rejections under 35 USC §102**

Independent claims 1 and 11 and their dependent claims 2-4, 10-14, 16, and 17 were rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 6,410,148 to Eaton, Jr., et al. (Eaton '148), and independent claims 1 and 11 and their dependent claims 2-4, 6, 8-14, 16, and 17 were rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 6,254,935 to Eaton et al. (Eaton '935). Applicants respectfully request reconsideration of these rejections in view of the amendments presented above as well as the following comments.

As noted in §2131 of the MPEP:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The identical invention must be shown in as complete detail as is contained in the ...claim. The elements must be arranged

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as required by the claim, but this is not an ipsissimis verbis test, i.e. identity of terminology is not required. (Citations omitted).

Applicants' independent claims 1 and 11 require a protective coating (20) on a silicon-containing surface. The protective coating (20) consists (essentially) of barium oxide, strontia, alumina, and silica, and incidental impurities so as to have a barium-strontium aluminosilicate (BSAS) composition. The protective coating (20) has an outer surface region (22) that consists essentially of one or more stoichiometric crystalline phases of BSAS and is substantially free (e.g., not more than five volume percent) of a nonstoichiometric second crystalline phase of BSAS that contains a substoichiometric amount of silica.

Both Eaton '148 and Eaton '935 were cited for broadly disclosing BSAS compositions suitable for protective coatings, including ranges for barium oxide, strontia, alumina, and silica that encompass ranges for these constituents recited in Applicants' claims, for example, dependent claims 3, 4, and 12-14. The Examiner further stated that Eaton '148 gives "no indication of a non-stoichiometric material," and that Eaton '935 discloses a barrier layer that is "stoichiometric, no non-stoichiometric phase with sub stoichiometric silica is indicated."

As an initial point, though neither Eaton '148 nor Eaton '935 expressly disclose the presence of non-stoichiometric phases or material, the presence

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of non-stoichiometric phases/materials is inherent in their disclosed compositions because these patents allow for as little as 50 volume percent stoichiometric (celsian/hexacelsian) BSAS.

Applicants disclose and claim a BSAS protective coating (20) essentially free of non-stoichiometric BSAS, which Applicants teach is the result of selectively formulating the starting material for the coating (20) and selectively processing the deposited coating (20). According to Applicants' teachings, the processes and compositions taught by Eaton '148 nor Eaton '935 result in the presence of non-stoichiometric BSAS, specifically a lamella phase containing a sub-stoichiometric amount of silica. See Applicants' specification at [0007] and [0033]. Eaton '148 and Eaton '935 do not teach or suggest anything as to how or even why the nonstoichiometric phase absent in Applicants' claimed coating can or should be avoided. In other words, Eaton '148 and Eaton '935 do not disclose with any specificity the essential subject matter of Applicants' claims rejected under 35 USC §102. This fact is important because, under MPEP §2131.03,

When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under

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the statute." What constitutes a "sufficient specificity" is fact dependent.

Also relevant to this issue is:

An accidental or unwitting duplication of an invention cannot constitute an anticipation.

*Application of Felton*, 179 USPQ 295 (CCPA 1973).

Because Eaton '148 and Eaton '935 disclose nothing as to how or even why nonstoichiometric phases should be avoided, the absence of such phases would be purely accidental, and therefore neither Eaton '148 nor Eaton '935 can constitute an anticipation of Applicants' claimed invention. Applicants also believe that Eaton '148 and Eaton '935 "are so unacceptably vague concerning characteristics [e.g., absence of nonstoichiometric phases or porosity] of products [e.g., coatings] produced by their respective processes as not to support an anticipation rejection." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 303 (Fed. Cir. 1983).

Regarding claim 17 under each of the §102 rejections, the Examiner also stated that

A chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2nd 1655, 1658 MPEP 2112.01. . . . the claimed physical property relating to the porosity after heating is inherently present in the prior art.

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However, *In re Spada* pertains to properties of a composition, whereas Applicants' claimed limitation of porosity pertains to a coating. A BSAS coating is not inherently free of porosity. Instead, whether porosity will be present in a BSAS coating depends on numerous factors, including how the coating is formed. See, for example, the Examiner's observation that Applicants' claimed coating (20) "may be made by a materially different process such as applying the coating to a mold, applying the silicon surface to the coating in the mold and lifting the silicon surface with the coating out of the mold." Page 2 of the Office Action. The Examiner's reliance on *In re Spada* is improper because a BSAS coating formed by the method described by the Examiner would not inherently contain (or lack) porosity. Therefore, Applicants believe that the limitation of claim 17 (now also recited in claim 42, which depends from claim 1), provides patentable distinction of the prior art.

Regarding claim 6, the Examiner cited Eaton '935 as disclosing

one or more BSAS-containing layers, one of which may be a mullite-barium-strontium-aluminosilicate layer, as an intermediate layer or a second protective coating. This creates a thermal barrier with a lower non-stoichiometric mullite-barium-strontium-aluminosilicate phase.

However, as now amended, Applicants' claimed protective coating (20) is required to consist (essentially) of barium oxide, strontia, alumina, and silica



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(plus incidental impurities), and it is this same BSAS protective coating (20) that is claimed to have a non-stoichiometric subsurface region (24) beneath a fully stoichiometric surface region (22) of the coating (20). Because Eaton '935 is limited to an entirely separate nonstoichiometric coating containing mullite, Eaton '935 does not anticipate claim 6.

In view of the above, Applicants believe that neither Eaton '148 nor Eaton '935 anticipate independent claims 1 and 11 or any of their dependent claims under the test for anticipation set forth at MPEP §2131, and therefore respectfully request withdrawal of the rejections under 35 USC §102.

### **Rejection under 35 USC §103**

Dependent claims 5, 7, and 15 were rejected under 35 USC §103(a) as being unpatentable over Eaton '935 in view of U.S. Patent No. 6,352,790 to Eaton et al. (Eaton '790). Applicants respectfully request reconsideration of this rejection in view of the following comments.

As noted above, Applicants teach and claim a protective BSAS coating (20) in which nonstoichiometric phases are substantially absent, which Applicants teach is the result of selectively formulating the starting material for the coating (20) and selectively processing the deposited coating (20). As also discussed above, Applicants believe that Eaton '935 is completely lacking in



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any suggestion as to how or even why to avoid nonstoichiometric phases in a BSAS coating.

Applicants believe that Eaton '790 cannot be said to supplement the teachings of Eaton '935 in order to arrive at Applicants' invention, in that Eaton '790 expressly teaches a BSAS coating that intentionally contains nonstoichiometric BSAS phases containing substoichiometric amounts of silica (column 2, lines 17-20), which is completely contrary to Applicants' claimed coating. Therefore, if the teachings of Eaton '790 are to be relied on under 35 USC §103, the combination of Eaton '935 and Eaton '790 leads to a BSAS coating that contains nonstoichiometric BSAS phases that - according to Applicants' teachings - are volatile and therefore undesirable.

For the above reasons, Applicants respectfully request withdrawal of the rejection under 35 USC §103(a).

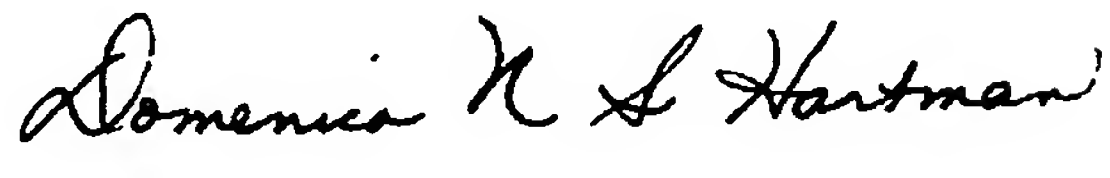
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**Closing**

In view of the above, Applicants believe that the claims define patentable novelty over all the references, alone or in combination, of record. It is therefore respectfully requested that this patent application be given favorable reconsideration.

Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

By 

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Attachment: Fee Transmittal form